Lithogenic sources, composition and intra-annual variability of suspended organic matter and particulate metals supplied from pristine rivers to the Western Cantabrian Sea (Bay of Biscay, SW Europe)

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Abstract.

Fluvial transport of suspended particulate matter (SPM) is one of the main pathways by which terrestrial constituents are dispersed over continental shelves. Despite the extensive research on large rivers there is still little information available of organic matter and metals in SPM for small world rivers and, particularly, those of the Western Cantabrian coast. The rias of Viveiro, Barqueiro and Ortigueira are located in this coast where the Landro, Sor, Mera, Landoi and Lourido low anthropogenic impacted rivers run. The present study is part of a broader effort aiming to characterize the hydrological and sedimentological behavior of the river-ria systems in the Western Cantabian coast, and their impact and contribution to shelf sediments.

From January 2008 to February 2009 hydrochemical fluvial samplings were carried out fortnightly. Conductivity, temperature and pH were in-situ measured and dissolved oxygen saturation percentage and chlorophyll-a concentration determined. Concentrations of SPM, particulate organic carbon and nitrogen and particulate metals were determined. Data on daily discharge were obtained from fluvial gauging stations. Moreover, 71 surface sediment samples from the Northern Galician Rias were collected and metal contents analyzed.

The lithological features of mafic and ultramafic rocks of the Ortegal Complex (Landoi and Lourido river basins), the Ollo-de-Sapo metamorphic domain (Sor and Mera) and the Manto-de-Mondoñedo granitic domain (Landro) drained by these rivers have a great influence in the trace metal composition of fluvial SPM and ria sediments. Thereby, the parental minerals in the hinterland point to the influence of the Ortegal Complex on the distribution of Cr, Ni and Co in SPM and shelf sediments. Thus, the coastal metal enrichments are supposed to be due to natural conditions more than of anthropogenic influence. This fact should be carefully considered when developing environmental management strategies.